Nelli Karila

Do YOU KNOW HOW YOUR FOOD HAS BEEN PRODUCED?
Sustainable Development in Food Industry

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ABSTRACT

Unit	Date	Author
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Food is a vital thing for all the humans in the world, as surviving without it is not possible. Enormous amount of food is consumed every day and therefore food industry is a huge business nowadays. However, food industry is not a trouble-free industry, as there are many broad problems related to it.

The aim of this thesis was to examine food industry from the sustainable development point of view. The main aim was to find out what ordinary consumers are thinking about the topic and what are the things that matter the most for them when they are buying food. In this research, Centria students were chosen as a target group. The theoretical framework of this thesis consisted of three topics: problems related to food industry, sustainable development methods and supporting sustainable food production as a consumer. For doing the research, a quantitative research method was chosen and a questionnaire was designed. The survey was conducted in Centria's main campus in talonpojankatu Kokkola in 12th of October.

The survey revealed that a thing which mattered the most for students when buying food, was cheap price. Healthiness was also an important matter for several students. Many of the students bought organic food every week or couple times a month. A clear majority had a diet which included meat or fish but still quite many of them had also thought about reducing their meat and fish eating.

Key words
food industry, food production, quantitative research, sustainable development

TIIVISTELMÄ

Yksikkö Kokkola-Pietarsaari	**Aika** Marraskuu 2016	**Tekijä** Nelli Karila
Koulutusohjelma Matkailun koulutusohjelma		
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Työelämäohjaaja		

Ruoka on elintärkeää kaikille maailman ihmisille, sillä selviytyminen ilman sitä ei ole mahdollista. Joka päivä, maailmassa kulutetaan valtava määrä ruokaa ja ruokateollisuus onkin sen vuoksi nykyään todella iso bisnes. Ruokateollisuus ei kuitenkaan ole täysin ongelmaton teollisuudenala, sillä siihen liittyy myös monia laajoja ongelmia.

Tämän opinnäytetyön tavoitteena oli tutkia ruokateollisuutta kestävän kehityksen näkökulmasta. Työn päätavoitteena oli selvittää mitä tavalliset kuluttajat ajattelevat aiheesta ja mitkä ovat ne asiat, joihin he kiinnittävät eniten huomiota ruokaa ostaessaan. Tämän opinnäytetyön teoreettinen viitekehys muodostuu kolmesta aiheesta, joita ovat ruokateollisuuten liittyvät ongelmat, kestävän kehityksen metodit sekä kestävän ruokatuotannon tukeminen kuluttajana.

Tutkimusmetodina käytettiin määrällistä tutkimusta ja tutkimustulosten keräämiseksi suunniteltiin kyselylomake. Tutkimuksen kohderyhmänä olivat Centrian opiskelijat ja tutkimus toteutettiin Centrian pääkampuksella talonpojankadulla, Kokkolassa 12. lokakuuta.

Tutkimustulokset osoittivat, että asia joka merkitsi opiskelijoille eniten ruokaa ostaessa, oli edullinen hinta. Myös terveellisyys oli tärkeä asia usealle. Monet opiskelijoista ostivat luomuruokaa joka viikko tai pari kertaa kuussa. Selvällä enemmistöllä vastaajista oli lihaa tai kalaa sisältävä ruokavalio, mutta melko moni heistä oli myös ajatellut vähentää lihan ja kalan syöntiään ja syödä enemmän kasvisruokia.

Asiasanat
kestävä kehitys, kvantitatiivinen tutkimus, ruokateollisuus, ruuan tuottaminen

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1 INTRODUCTION

The need of food is a common thing for all the humans in the world, as surviving without it is not possible. People like to buy it, cook it and talk about it. In ancient times, people had to hunt and gather all the food by themselves but nowadays it is no longer necessary for the most people: thanks to the supermarkets, market places, restaurants and other places! There is plenty to choose from, as producing food is a huge business nowadays.

A lamentable fact is that there are also a lot of different kinds of problems related to food industry. In many countries, people are fighting against the hunger but at the same time, a lot of food is thrown away elsewhere. Massive food production is harming the environment and speeding up the climate change. Strong pesticides, which are used in agriculture, are very hazardous for the nature as well as for people. Child labor, inhumanely treated workers and production animals' miserable living conditions are also part of food production. To solve the problems, more sustainable production methods should be developed and social and ethical factors should be taken into consideration a lot better. Political decision making is needed to make things better but normal consumers have also a very important role, as by consuming, they can influence on what is being produced and how.

The aim of this thesis is to investigate food industry and its sustainability and find out what ordinary consumers are thinking about these issues. In this case, Centria students were chosen as a target group. Do the students think that it is easy to find out how the food has been produced? What are the things that matter the most for students when they are buying food? Are they buying organic and local produced food? How often are they throwing away food at their homes? Food industry is such a broad topic that it is almost impossible to take all the issues into consideration but this thesis aims to give a good overview of the topic. In this report, things are examined in general but also in a Finnish point of view.

The theoretical part of the thesis starts with a chapter of food industry related problems. Social, ethical and environmental problems are taking into consideration and

there is also a discussion about the genetic modification of food. The next chapter deals with sustainable development methods, such as organic farming and agroecological farming. There is also a chapter about consumer's ability to support sustainable development in food industry. This chapter discusses for example about organic, local and seasonal food, fair trade products and the reduction of animal products. After the theory part, research methodology is discussed. The practical part of this thesis was a research conducted among Centria students and this chapter explains the related theory. In the following chapter, research results and the outcome of the questionnaire are presented and the thesis ends with a chapter of conclusions.

2 THE TRUTH BEHIND FOOD INDUSTRY

Food is bought and consumed every day but the extensive problems related to the food industry are not always thought. The problems are social, financial, ecological and also related to consumers' health. The truth behind food and beverage industry it is not always as pleasant as it seems to be and the consumers should not blindly believe everything they see or hear. (Kovanen & Lapinoja 2014, 15)

2.1 Social and ethical problems

There are many social and ethical problems related to food industry. World's increasing population is one of the biggest challenges in food industry since it is expected to increase from the current 7 billion to almost 10 billion by 2050. The population is growing most rapidly in developing countries. (Baldwin 2015, 2.) It has been estimated that world's food production should be increased by 70% so that there would be enough food for everyone. Nevertheless, according to some assessments, almost 50% of world's food goes to waste. What is more, at the same time hunger and undernourishment are also significant problems in many countries. These problems point that the distribution of food is very unequal in the world. Something should be done differently in the food production so that these issues could be solved. (Mononen & Silvasti 2012, 71 & 177.)

Child labour is also an unfortunate part of food production. Food and Agriculture Organization of United Nations (FAO) defines child labour "as work that is inappropriate for a child's age, affects children's education, or is likely to harm their health, safety or morals". According to FAO nearly 100 million boys and girls are engaged in child labor in farming, livestock, forestry, fishing or aquaculture. These children are often working long hours, facing occupational hazards and the working is also a risk for their education. (FAO 2016.)

Pesticide use in agriculture is one considerable problem in food production, since they are very harmful both for the environment and farmworkers. Pesticides are inherently toxic materials which are developed and used to destroy or prevent growth or infestations of unwanted insects, plants, and other pests. The exposure of pesticides causes a lot of chemical-related injuries and illnesses for the farmworkers. Long-term exposure may have serious consequences, since it can cause cancer, neurological disorders, hormonal and reproductive health problems, birth defects and infertility. (Farmworker Justice 2016.) Pesticides are especially hazardous for children as they have a lower tolerance to toxic substances and their ability to discharge them also differs from adults. To solve the problem, safer agriculture practices and technologies should be promoted and harmful pesticides should be replaced with better alternatives. (International Labor Organization ILO 2011.)

Production animals' welfare is a current topic in food production. According to Lappalainen (2012) production animals are doing better in Finland than in many other countries but many things should still be improved. A reminder of this was got in fall 2015, when some secretly filmed material from Finnish slaughterhouses were shown in YLE's MOT television show. Video material revealed several significant shortages in slaughterhouses' actions and animals were treated unnecessary roughly. Some improvements should be made so that production animals could have better living conditions and they would be able to implement their species typical behavior. (Lappalainen 2012; Kaihovaara 2015.)

2.2 Environmental problems

World's massive food production has a remarkable impact on the environment. Industrial production is damaging soil and causing environmental emissions, and it needs modified plant species, stronger pesticides and more effective fertilisers. In many areas nature's tolerance is already exceeded. For example, in Finland, the agriculture is partly guilty for eutrophication of the Baltic Sea because the use of fertilizers is straining waters. Overfishing and industrial fish farming are also problems that are destroying seas and waters. (Kovanen & Lapinoja 2014,14.)

One of the biggest challenges for food production, especially in the future, is climate change. It is known that as a result of the climate change, average temperatures are rising, regional rainfalls are changing and sea level rises. These things are causing intense weather phenomena, like dry seasons, floods and hurricanes more and more often. It is clear that these phenomena are very challenging for food production. What is more, it has been estimated that food system causes almost 35% of the World's greenhouse gas emissions and the agriculture has a bigger impact on the climate change than traffic. It can be said that a bit absurdly, food production is guilty for its own problems. To avoid the problems, environment needs to be taken care of better and more sustainable production methods are needed. (Mononen & Silvasti 2012, 22 & 78.)

2.3 Genetic modification

Genetic modification is nowadays a part of food production. According to World Health Organization (WHO) genetically modified organisms (GMOs) can be defined "as organisms (i.e. plants, animals or microorganisms) in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating and/or natural recombination". In genetic modification, selected individual genes can be transferred from one organism into another, also between nonrelated species. Food which is produced from or using GM organisms is usually defined as GM food. (WHO 2016.)

Genetic modification has been used for about a decade now and soy, corn, cotton and canola are the most extensively farmed genetically-modified plants. The scientists were wishing that genetic modification would make farming methods better and the agriculture more environmental-friendly but yet that has not happened. Genetic modification was also considered to be one solution for feeding starved people in developing countries but many of them have not wanted to use it in their agriculture. Herbicide Round Up, which is used for GM plants, breaks very slowly in the nature and therefore it cannot be said that it would be very good for the environment. Moreover, it also may have unexpected and dangerous consequences if genetically-modified plants spread from fields to nature. Besides, it has not been examined very

carefully whether the genetically-modified food is completely safe for humans or not. (Mononen & Silvasti 2012, 164-173.) According to Finnish cell biologist Liisa Kuusipalo, animal tests have shown that genetic modification increased the number of cancers and liver and kidney damages (Vuorinen & Åström-Kupsanen 2013).

The cultivation of GM plants is the most extensive in the United States. In the area of European Union (EU) it is only possible to cultivate one GM plant species which is corn. (Gmo-vapaa Suomi 2016.) In Finland, genetically-modified groceries can still be avoided quite easily, since according to Finnish Food Safety Authority Evira, there are only few of them in Finnish market at the moment. If the product contains GMOs more than 0,9%, it has to be mentioned in the package. However, Finnish consumers do not know if the animals have been fed with genetically-modified fodder because that information does not have to be mentioned. (Evira 2016.)

3 SUSTAINABLE DEVELOPMENT METHODS

Finnish Ministry of the Environment defines sustainable development as “an ongoing and structured process where society undergoes changes with the aim of securing desirable living conditions for the current and future generations” (Finnish Ministry of the Environment 2015). As earlier mentioned, food production is polluting and harming the nature and causing a lot of other problems. The industry should follow the principles of sustainable development better, since the current situation is quite alarming. More attention should be paid especially for the environmental factors. (Mononen & Silvasti 2012, 14.)

3.1 Organic farming

The principle of organic production is to manufacture products of which production methods are not harmful to environment or to peoples, plants or animals’ health and welfare. Organic farming supports the protection of natural resources and biodiversity. One of the basic factors in production is perennial cultivation cycle where different plant species are alternating. (Evira 2016.) In organic farming, there are strict limits on chemical synthetic pesticide and synthetic fertilizer use, livestock antibiotics, food additives and processing aids and other inputs. Special attention is paid for animal welfare as the animals have more space to move and they are also spending time outdoors. Animals are only fed with natural fodder, since genetic modification is prohibited in organic production. (European Commission 2016.) Organic products are more expensive than conventionally produced ones because the production costs are higher in organic farming. For example, producing one kilo of organic meat is 37% more expensive than producing the same amount conventionally. (Mononen & Silvasti 2012, 147.)

Organic products can be identified with organic sign and in Finland there are three of them which are the most common: sun sign, leaf sign and ladybug sign. All these three can be seen in the picture below (PICTURE 1). Sun sign is Finland’s own

national organic sign and products with this sign, have to fill the terms of EU's organic statute. Evira admits the license of the sun sign. Leaf sign is EU's organic sign which has to be in all the packed groceries made in the EU area. Products with leaf sign are produced according to EU's organic statute and at least 95 % of their agricultural origin raw materials have to be organic. Ladybug sign is admitted and controlled by Organic union (Luomuliitto) and the sign is only accepted for organic product which are Finnish. (Luomu.fi 2016.)

PICTURE 1. Most common organic signs in Finland (adapted from vastuuverkko.fi 2015)

For farmers, organic production can offer novel opportunities, since it is a bit more profitable than the conventional farming. In organic production, the farmer is less dependent on the inputs which are acquired outside and the price variations of those inputs. Organic farming also employs bit more people than the conventional farming, which is a good thing for the countryside's business. (Luomu.fi 2016.)

In Finland, the organic markets have been growing steadily during the recent years. This can be seen in Finnish Organic Food Association Pro Luomu's statistics (FIGURE 1) below. According to Pro Luomu, the retail sale of organic food in Finland increased by 6.7% in 2015. The executive director of Pro Luomu, Marja-Riitta Kottila thinks that this a good achievement in the current economic situation when the total sales of consumer goods are going down. Retail experts are estimating that the demand of organic products continues to grow also during the upcoming years. (Pro Luomu 2016.)

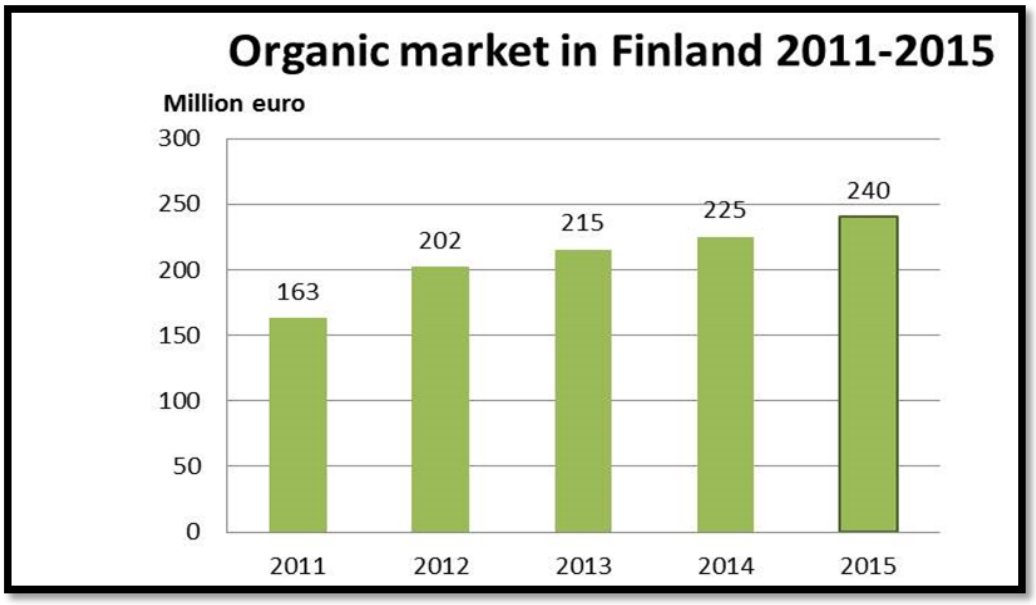

FIGURE 1. Organic market in Finland 2011-2015 (adapted from Pro Luomu 2016)

All in all, the aims and values of organic farming are clearly more sustainable than in factory farming. Still, it does not mean that all the farms should be changed as organic, since ethical farming and animal growing is also possible in other ways without the statutes of organic farming. (Kovanen & Lapinoja 2014, 327.)

3.2 Agroecological farming

Agroecological farming is considered to be one solution for more sustainable food production. The principle of agroecological farming is that the agriculture should work like nature does and be as natural as possible. Agroecology focuses on the interactions between plants, animals, humans and the environment. According to FAO agroecology “is based on the three pillars of sustainable development so that, with emphasis on economic, social and environmental approach sustainability, countries can increase their food production, at the same time protecting the environment and promoting social inclusion”. There are many similarities between organic and agroecological farming but agroecological farming is a broader concept.

Part of agroecological farming is just like organic farming but some farmers are using for example small amounts of purchased fertilizers. (Gmo-vapaa Suomi 2016; FAO 2016)

According to United Nations (UN), agroecological farming is a solution to food crises and it is also helping the World to deal with climate change and poverty. UN also reports that agroecological projects have shown that an average crop yield increased by 80% in 57 developing countries. (UN 2011.) Agroecological methods are not very well-known yet and one reason for this is the fact that they have not got enough attention and funding (Gmo-vapaa Suomi 2016). The author believes that agroecological methods are going to be even bigger trends in the future when food related problems are highlighting.

3.3 Minimization of food waste

The amount of food waste is a remarkable problem in food production. Waste arises in every stage of the food system: in agriculture, fields, transportation, concentration, grocery stores, canteens, restaurants and households. (Mononen & Silvasti 2012, 23.) According to Natural Resources Institute Finland (Luke), households are the number one source of food waste in Finland, since they are throwing away almost 130 million kilos of food a year (Luke 2016). Possible reasons for households' wasting are big package sizes, advertising and marketing, abundant selection and relatively cheap prices of food (Mononen & Silvasti 2012, 73). One probable reason is also the fact that some consumers are afraid to use groceries after the "best-before" or "use by" date, even thought they would still be useable. Microbiology docent Sebastian Hielm claims that old groceries can very well be eaten, especially the ones with best-before date mark. According to Hielm, those kinds of groceries are not becoming dangerous when they got old, they just might taste a bit different. Products with use by date mark, such as raw meat, can also be used old but then the consumer needs to be a little more cautious. It is important to store the groceries right and cook them properly. One solution is to freeze food since that is stopping the spoiling process and the food can be used later on. (Väisänen 2015.)

Political decision making is also a key factor what comes to minimizing the food waste. In the beginning of the year 2016, France became the first country in the world which forbade food waste by supermarkets. This means that it is against the law for supermarkets to throw away or destroy unsold food and instead of that, they have to donate it to charities and food banks. (Chrisafis 2016.) At the moment, similar law is being prepared in Finland. The law is likely to come true, since already over hundred Members of Parliament have signed the proposal (Sutinen 2016). The author thinks that the actualization of this law in Finland would definitely be a step for the right direction.

Minimization of food waste can also be an interesting business idea and a good example of this is a Finnish company ResQ Club. The company has launched a service which aims to put an end of wasting the food in restaurants. The name of this service is ResQ Club and it works in mobile devices and desktops. Via ResQ Club, people can see which nearby restaurants, hotels, bakeries and cafes are offering food waste on sale. Customers can pick up the food on-site at a discounted price. The discount is usually 40 to 70%. At the moment, ResQ Club has approximately 17 000 users in Finland and it already operates in many cities. The service has been expanded also to three different cities in Sweden. (Liimatainen 2016; Malminen 2016.) The author thinks that this kind of ideas are very inspiring and would definitely like to try the service. Unfortunately, it is not yet available in the author’s hometown Kokkola.

4 SUPPORTING SUSTAINABLE DEVELOPMENT AS A CONSUMER

Consumers are not able to solve all the problems related to food industry but they still have good chances to make a difference. A consumer who wants to support sustainable food production should be conscious and make well thought choices. By buying or not buying something, consumers can effect on the market and advance sustainable and ethical production. (Suomen YK-liitto 2016.)

4.1 Organic, local produced and seasonal food

As earlier mentioned, organic food is a good choice especially when environmental issues and animal welfare is taking into consideration. The assortment of organic food has been growing steadily within the years and nowadays, it is almost impossible to find a grocery store, which does not sell any organic food. Another good option is local produced food. Local produced food is defined as a food, which is produced as near as possible and its origin, producer and manufacturer are known. Since the origin and production chain are easy to find out, it is more effortless for the consumer to make sure that the production is sustainable. Local produced food is an environmental-friendly choice because it minimizes both packaging material and transportation kilometers. By buying local produced food, the consumer also supports local businesses and employment. (Suomen YK-liitto 2016; The Central Union of Agricultural Producers and Forest Owners MTK 2012.)

In Finland, Local produced food has become almost a trend among the consumers, as so called “REKO-food circles” are very popular these days. Abbreviation “REKO” comes from Swedish words “rejäl konsumtion” which means fair consumption. REKO is a sale and distribution channel for local food. In closed Facebook groups, producers are reporting what kind of products they are offering and consumers are leaving their orders. At agreed date, producers and consumers meet each other and the food is changing its owner. REKO meetings are usually arranged fortnightly for example in a big parking lot. Thanks to REKO, producers are getting a direct feedback about their products and also smaller producers have a distribution channel

now. Organic farmer Thomas Snellman established REKO at Ostrobothnia in 2013 and today there are approximately 50 REKO-food circles which have over 27 000 members. (Vihanta 2015; Runsten 2015.)

Favoring of seasonal food is good and more ecological way to consume food. For example, growing of seasonal vegetables takes less external energy, like light and warmth, and the vegetables are also more affordable for the consumer. Seasonal vegetables are also fresher and they taste better, since the taste has not been ruined with stocking and long transportation. What is more, growing of seasonal vegetables often requires less fertilizers and pesticides. All in all, seasonal food is a good choice in many ways. (Satokausikalenteri 2015.)

4.2 Urban farming

Urban farming is a convenient way to produce food ethically. Urban farming means small-scale farming, which is made either individually or communally. It can be for example growing herbs on a windowsill or setting up a plantation in a roof of the house. Urban farming decentralizes food production and it is not dependent on oil like the industrial food production. It may not be possible to grow everything in an urban environment but at least it is possible for many cultivars. (Kovanen & Lapinoja 2104, 334.)

4.3 Reducing animal products

The consumption of animal products, especially meat consumption, should be recused for more sustainable future. The raising of animals is causing greenhouse gas emissions and it takes land area from original nature and other food production. One problem is also untreated animal waste which is polluting rivers and streams. Producing meat takes a lot more cultivation area than producing vegetables, as for example to produce one kilo of meat, 10 kilos of vegetable fodder are needed. Reducing the meat consumption would also be a good thing for people’s health. It has been examined that by reducing it, the risk of heart diseases, obesity and certain

cancers decreases. Meat can be replaced with many protein rich vegetables like for instance with soybeans, fava beans, lentils, peas, nuts and seeds. Nowadays there are also many plant-based alternatives for other animal products, like for example for milk, yoghurt, cream and cheese. (Ilmasto-opas 2016; People for the Ethical Treatment of Animals PETA 2016.)

According to the Baltic Sea researchers, meat eating and livestock farming are more harmful to Baltic Sea than agriculture which is based on vegetable farming. Researchers think that people should reduce their meat consumption, favor organic meat instead of conventionally farmed and eat more vegetables, as those things would decrease the emission to the Baltic Sea. (Hjelt 2015.) Finns should also take action and reduce their meat consumption, as an average Finn eats approximately 78 kilos meat per year (Lappalainen 2012, 19). The author considers this to be quite of a huge amount and thinks that people should definitely eat less meat and favor plant-based options more. These days there are so many different options for meat that it should not be a problem to eat vegetarian food at least couple days a week.

4.4 Fairtrade products

When consumer wants to make sure that the production method of a product is sustainable and ethical, Fairtrade product is a good choice. Fairtrade products can be identified from the Fairtrade mark which is seen in the picture below (PICTURE 2). Fairtrade is a global organization which supports farmers and workers in developing countries and guarantees reasonable wages and proper working conditions for them. Its mission is to “connect disadvantaged producers and consumers, promote fairer trading conditions and empower producers to combat poverty, strengthen their position and take more control over their lives”. Forced labor and child labor are forbidden in the Fairtrade standards. Fairtrade wants to support nature’s well-being and biodiversity and therefore the sustainable development of farming methods is also included in their principles. Fairtrade Labelling Organizations International defines the criteria of the system. The assortment of Fairtrade products is very extensive, as it includes for example bananas, coffee, tea, cocoa, honey, rice and wine. Fairtrade mark can also be found from non-food products such

as flowers, plants, sports balls and clothes which are made from cotton. (Fairtrade International 2011; Kovanen & Lapinoja 2014, 289.)

PICTURE 2. The Fairtrade mark (adapted from fairtrade.net 2011)

4.5 UTZ certified products

UTZ certificate is also a mark which tells about the sustainability of a product. UTZ certified products have been produced in a way which is fair to producers, suppliers and the environment and UTZ's mission is "to create a world where sustainable farming is the norm". UTZ products can be idenfied with UTZ logo which is seen in the picture below (PICTURE 3). The requirements of getting the UTZ certificate include good agricultural practices and farming management, safe and healthy working conditions, abolition of child labor and protection of the environment. To make sure that the sustainability standards of the UTZ program are followed, the farmers are regularly audited. UTZ certified products include coffee, cocoa, tea and hazelnuts and there are already over 20 000 different products across 135 countries. (UTZ.org 2015.)

PICTURE 3. UTZ logo (adapted from finnwatch.org 2016)

5 CONDUCTING THE RESEARCH

The practical part of this thesis was a research conducted among Centria students. This chapter explains the theory related to research methodology, presents the research objectives and discusses about reliability and validity issues.

5.1 Research methodology

Research methods are usually divided into two main types: quantitative and qualitative methods. Qualitative research is mainly exploratory research which gathers information that is not in numerical form. For example, open-ended questionnaires, unstructured interviews and observations belong to qualitative research. Qualitative data is normally descriptive data and therefore it is harder to analyze than quantitative data. In Quantitative research the data is gathered in numerical form which can be put into categories or into certain order, or measured in units of measurement. For example, online and paper surveys, face-to-face interviews, telephone interviews, online polls, and systematic observations are included in quantitative data collection methods. Quantitative methods are much more structured than Qualitative methods. (E. Wyse 2011; McLeod 2008.) In this research, quantitative research method was used, as was thought to be the most suitable method for this research.

5.2 Questionnaire design and distribution

It is important to take certain issues into consideration when designing a questionnaire. Questions should be clear and language familiar to the respondents and the use of jargon or technical terms should be avoided. It is good to use short questions which go straight to the point, since long questions are more likely to be misunderstood by the respondents. Leading questions which imply that a certain answer is correct, should also be avoided. To avoid bias, questions have to be in a logical order and organized by topics. It is good to start the questionnaire with general questions and place more specific and difficult ones to the end. Broadly, there are

two types of questions which are used in questionnaires: closed and open-ended questions. In closed questions, the respondents are choosing an option from a number of predetermined answers. When the question is open-ended question, the respondents are free to answer in their own words. (Hair et al. 2007, 265-275.) For this research, a paper survey with closed questions was chosen.

In this research, Centria students were the target group. The main objective of the research was to find out what Centria students are thinking about the issues related to food industry and its sustainability. The researcher was curious to know whether the students are taking sustainability and ethical issues into account or not when they are buying food.

The research was conducted in Centria's main campus in talonpojankatu Kokkola in 12th of October. The survey was carried out in campus's lobby and in two class rooms with the permission of teachers Katarina Broman and Nina Hynynen. When a favorable amount of answers had been gathered, the results were calculated together and then transformed into statistics with Microsoft Word. The research was conducted as an informed inquiry so that the researcher was present and distributed the questionnaires. This was thought to be a good way of conducting the survey, since the researcher was able to tell about the aims of the research and the respondents were able to ask questions, if they did not understand something. In this kind of manner, it is possible to achieve a relatively large sample size and a high response rate. On the other hand, the method can be time consuming and the researcher's presence may have an effect to the respondents, for example in a way that they do not fill the survey in peace and thought.

5.3 Reliability and validity issues

When doing a scientific study, it is essential to take reliability and validity issues into consideration. Reliability relates to the term consistency, while validity is associated with the term accuracy. Reliability describes the ability to give precise results. A survey is considered reliable if it was conducted again and the result would still be the same. The less similar the results are, the lower the reliability is. Reliability is

important with all forms of questions but it is most commonly associated with multi-item scales which consist of multiple items representing a concept. (Hair et al. 2007, 240-241.) Validity describes whether one can draw meaningful and useful conclusions from scores on the instruments. The three traditional forms of validity are content validity, predictive validity and construct validity. Content validity describes whether the items are measuring the content they were supposed to measure. Predictive validity assesses whether the scores predict a criterion measure and how the results are correlating with other results. Construct validity estimates what the construct or scale is actually measuring. (Creswell 2009, 149; Hair et al. 2007, 246-247.)

The researcher thinks that in this research, reliability and validity issues were taken into consideration quite well. The questionnaire was designed so that it would give answers to the previously set research questions and all the data was gathered carefully. The researcher believes that if the research would be repeated for the same target group, the result might stay quite similar.

6 RESEARCH RESULTS

This chapter will present the research results. All in all, there were 15 questions in the questionnaire. First three questions collected basic information about the respondents, such as their gender and age. The rest of the questions were related to food industry sustainability and respondents' opinions towards it. Some of the questions were also related to respondents' food consumption habits. Question topics were for example organic food, local produced food, genetic modification and food waste.

6.1 Basic information about the respondents

In table 1 it can be seen, that 80 respondents answered the survey. The gender distribution of the respondents was quite even, since 42 (52,5%) of them were males and 38 (47,5%) females.

TABLE 1. Gender distribution of the respondents

	Frequency	**Percent**
Male	42	52,5
Female	38	47,5
Total	80	100

The age distribution was not as even, as the gender distribution. The respondents were given five age groups to choose from: 17 to 21, 22 to 26, 27 to 31, 32 to 36 and over 36. Table 2 shows that all the age group except the option "32 to 36", were represented in the survey. Over a half of the respondents (60%) belonged to the age group 17 to 21, and the frequency of this group was 48. The second biggest group (27,5%) was 22 to 26 with 22 respondents. A minority (11,25%) belonged to the group 27 to 31, which was equal to 9 persons. Only one person represented the group over 36, which was equal to 1,25%.

TABLE 2. Age distribution of the respondents

	Frequency	Percent
17-21	48	60
22-26	22	27,5
27-31	9	11,25
32-36	0	0
Over 36	1	1,25
Total	80	100

Third question was about respondents' nationality. There were three available options to choose from: Finnish, EU citizen and non-EU citizen. Table 3 points out that a bit over a half (55%) of the respondents were non-EU citizens which was equal to 44 persons. Finnish people were also quite well presented in the survey, since 30 persons were Finnish which was equal to 37,5%. EU citizens were a clear majority, as only 6 persons represented this group, which was equal to 7,5%.

TABLE 3. Nationality distribution of the respondents

	Frequency	Percent
Finnish	30	37,5
EU citizen	6	7,5
Non EU citizen	44	55
Total	80	100

6.2 Issues related to food industry

The rest of the questions were related to food industry and its sustainability. In next question, the respondents were asked whether they think that it is easy to find out

how the food that they buy has been produced. The given options were yes, no and hard to say. From figure 2, it can be seen that slight majority of the respondents, 34 of them, thought that it was hard to say whether the production method of food was easy to find out or not. The second popular option was “yes”, as 28 persons chose this option and thought that the production method was easy to find out. Eighteen respondents answered “no” as in their opinion, the production method was not easy to find out.

FIGURE 2. The production method of food

Organic food has become almost a trend during the recent years and the researcher was interested to know, how often the respondents are buying organic food. Three options were given and they were: every week, couple times a month, once in a month or more rarely, couple times a year and I don’t but organic food. Figure 3 shows that all the given options were presented. The most popular answer was “every week”, as 31 respondents chose this option. Twenty respondents told that they are buying organic food couple times a month, while 11 persons told that they do not buy organic food. Almost as many, 10 persons, chose the option “couple times a year” and 8 persons told that they buy organic food once in a month or more rarely.

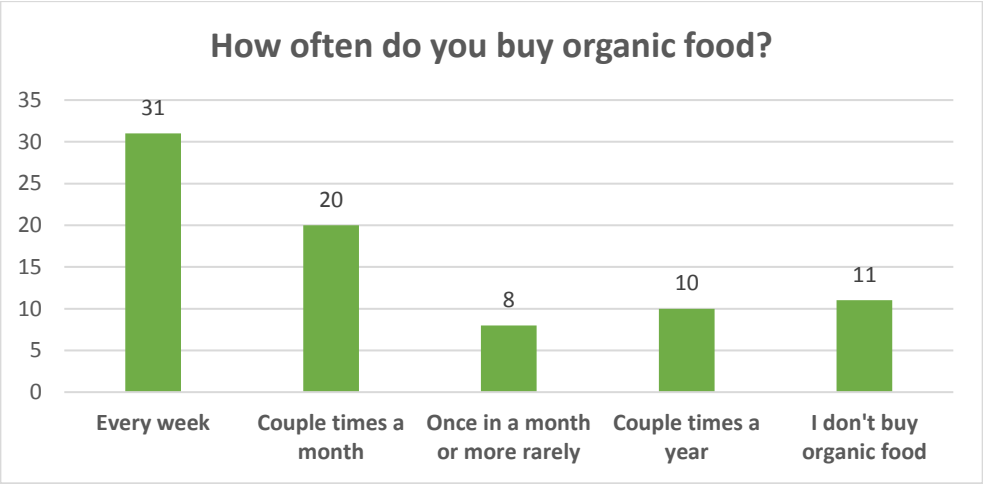

FIGURE 3. Buying of organic food

Sixth question was also related to organic food. The respondents were asked whether they think that organic food is too expensive. The available options were yes, no and hard to say. Figure 4 demonstrates that majority of the respondents, 53 of them, thought that the organic food is too expensive. Sixteen persons chose the option “hard to say”, while 11 persons answered “no”.

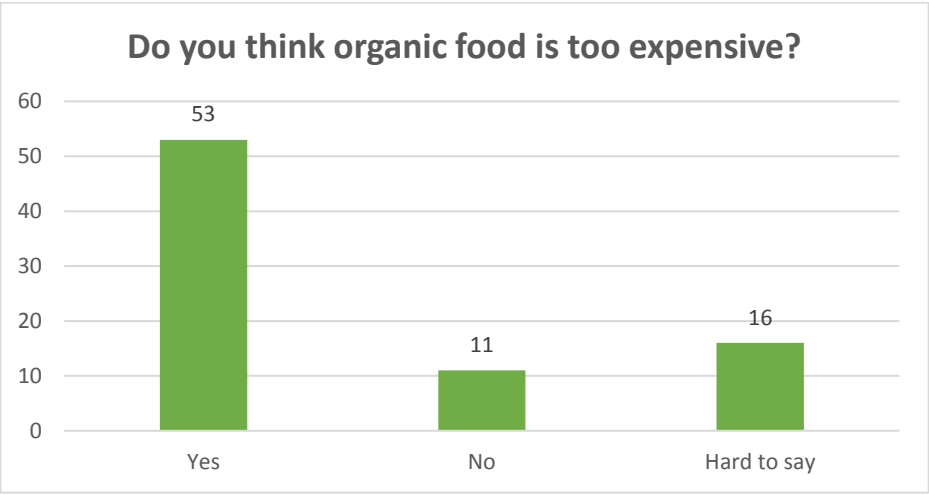

FIGURE 4. The expensiveness of organic food

Next, the respondents were asked whether they favor local produced food if it is available. The available options were “yes, as often as possible”, “yes, sometimes” and “no”. Figure 5 shows that the distribution between the answer “yes, as often as

possible” and “yes, sometimes” was very even, as 39 persons chose “yes, sometimes”, while 34 persons answered “yes, as often as possible”. A clear minority answered “no” since only 7 respondents chose this option.

FIGURE 5. Favoring of local produced food

In the 8th question, the respondents were asked what are the things that matter the most when they are buying food. The respondents were asked to choose maximum of three options and the given options were cheap price, familiarity, delicacy, organic sign, locality, healthiness, ethicalness and other. From figure 6 can be seen that the options that mattered the most for the respondents were cheap price and healthiness, as 64 persons chose the option “cheap price” and 60 persons the option “healthiness”. The option “familiarity” and “delicacy” were even, as they both got 23 answers, while the options “organic sign” and “locality” were also even with 15 answers. The option “ethicalness” was chosen by 12 respondents and 3 persons chose the option “other”. The other things that mattered were the preservation of food, deliciousness and taste.

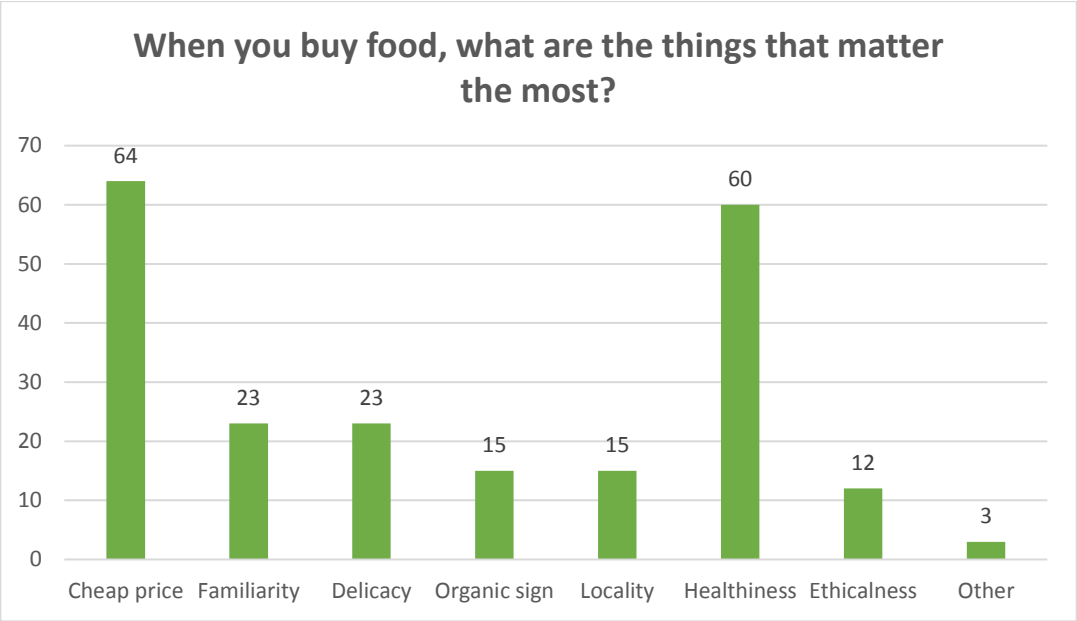

FIGURE 6. Things that matter the most when buying food

In the next question the respondents were asked whether meat (beef, pork, chicken etc.) or fish belongs to their diet. The given options were “yes” and “no”. Figure 7 points out that majority of the respondents, 66 of them, have a diet which includes meat or fish, while 14 respondents have a diet which does not include meat or fish.

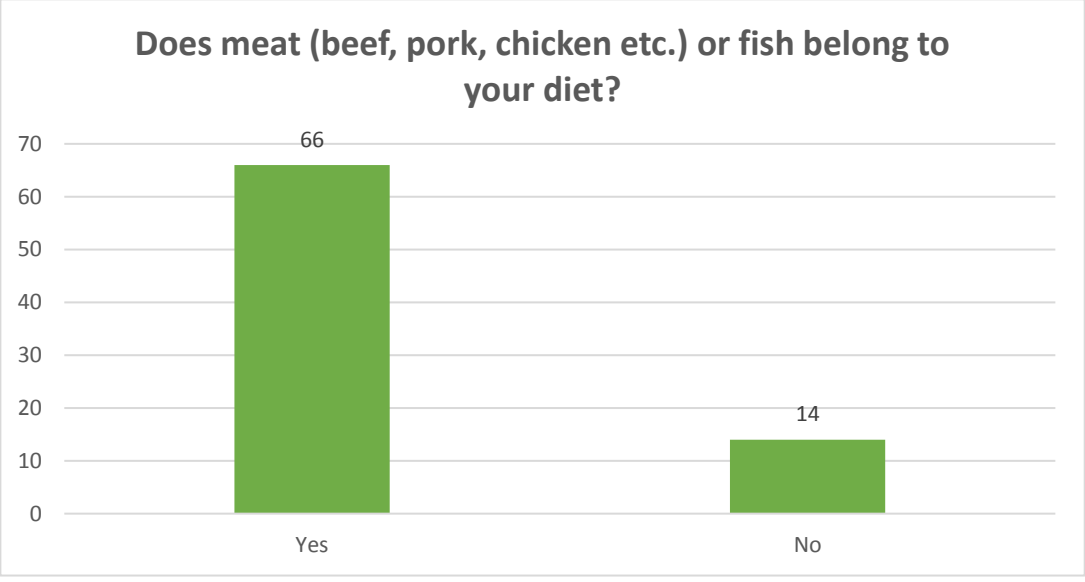

FIGURE 7. A diet including meat or fish

In 10th question, the respondents were asked whether they have thought about reducing their meat and fish consumption and eat more vegetarian food instead. The

available options were “yes” and “no”. This question was designed for those respondents whose diet includes meat or fish, so the ones who answered “yes” to the previous question, were asked to give their answers. The ones who answered “no” to the previous question and whose diet does not include meat or fish, were asked to pass this question and move to the 11th question. Figure 8 shows that a slight majority, 36 respondents, had thought about reducing their meat and fish consumption, while 25 respondents had not thought about that. In addition, 5 persons did not answer to the question, even thought they had answered “yes” to the previous question. What is more, 8 persons mistakenly gave their answer, although they answered “no” to the previous question.

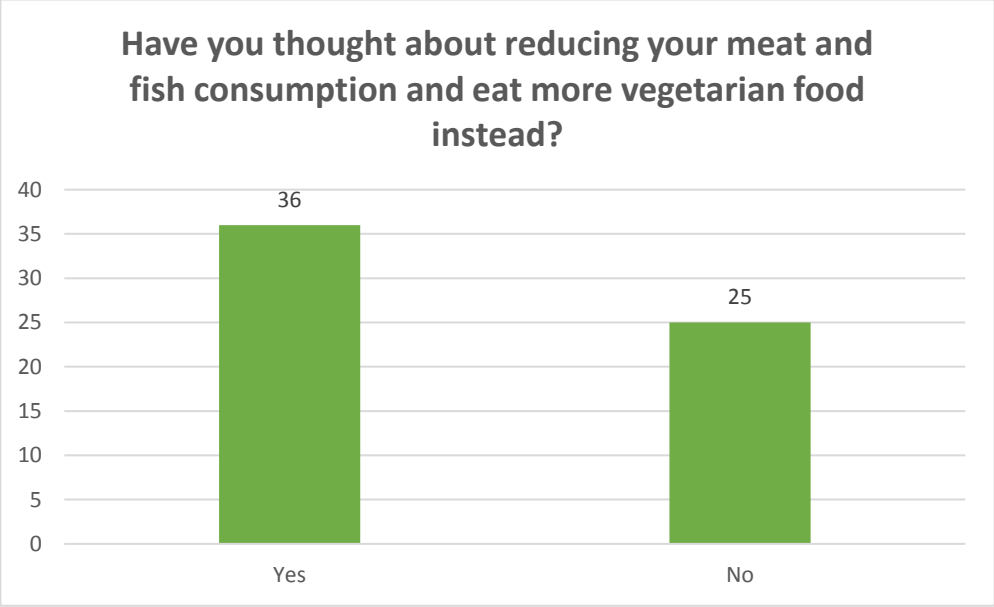

FIGURE 8. Reducing meat and fish consumption

Next question was about production animals. The respondents were asked, if they think that production animals are treated well in Finland. The given options were “yes”, “no” and “hard to say”. Figure 9 reveals that majority of the respondents, 41 of them, thought that production animals are treated well in Finland. The option “hard to say” was chosen by 26 persons, while 5 persons answered “no”. In addition, 7 persons did not answer to the question and one person answered “yes” and “no”.

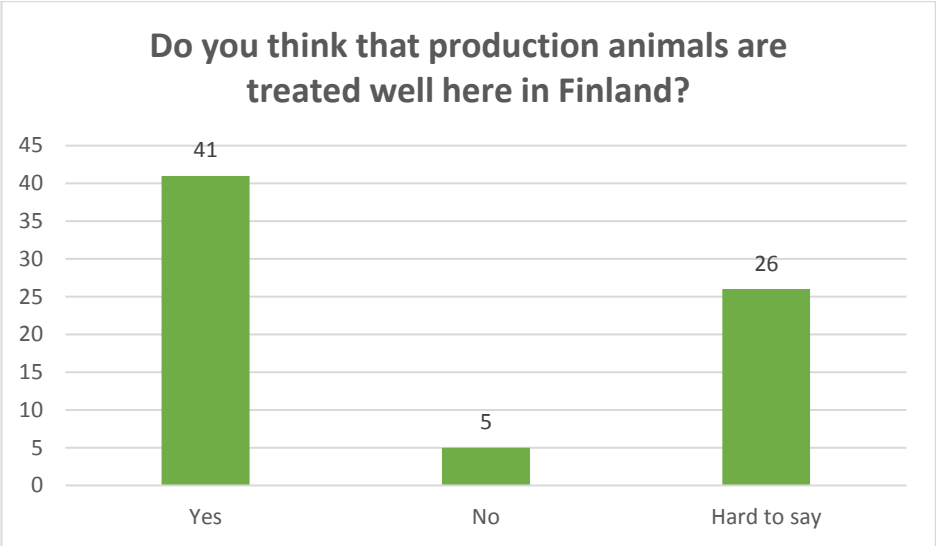

FIGURE 9. Production animals' treatment in Finland

Genetic modification of food is a current topic and therefore in the 12th question, the respondents were asked what they are thinking about it. Four different options were given: "I consider it as a positive thing", "I consider it as a neutral thing", "I consider it as a negative thing" and "hard to say". As figure 10 shows, 28 persons considered genetic modification of food as a neutral thing. The option "I consider it as a negative thing", was chosen by 22 persons, whereas 17 respondents thought that it was hard to say. The option "I consider it as a positive thing", was chosen by 13 respondents.

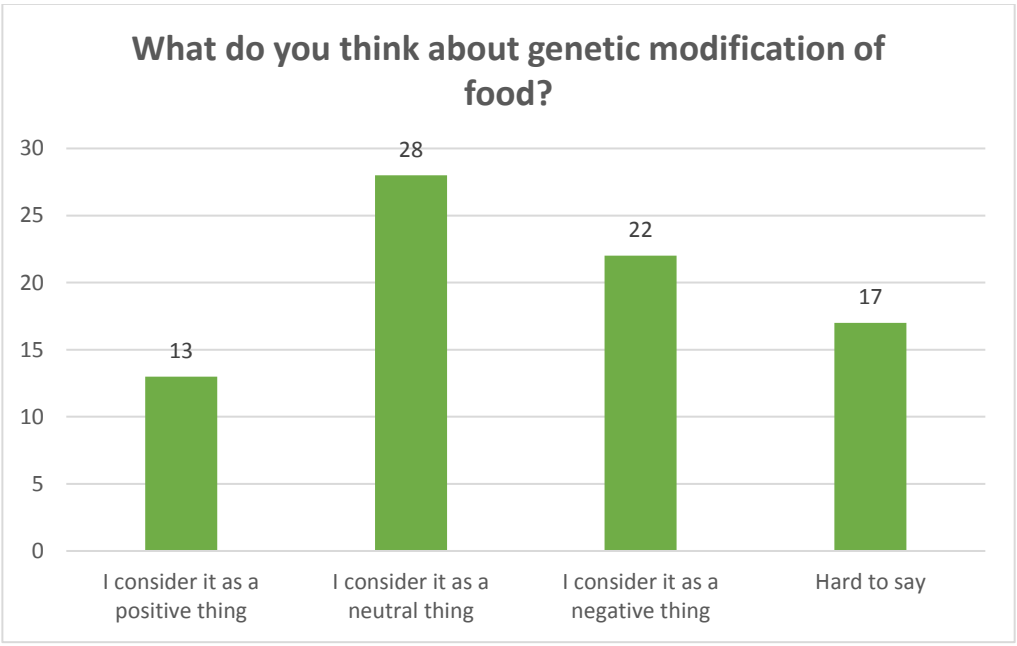

FIGURE 10. Genetic modification of food

In households, a lot of food is thrown away every year and in the 13th questions, the respondents were asked how often do they throw away food at their homes (for example because they did not remember to use the food and it spoiled). The given options were “several times a week”, “once or twice a week”, “once or twice a month”, “a few times a year” and “I never throw away food”. Figure 11 points out that 34 respondents throw away food once or twice a month, while 23 persons throw away food a few times a year. Ten persons chose the option “once or twice a week” and 8 respondents answered that they never throw away food. Only 5 persons throw away food several times a week.

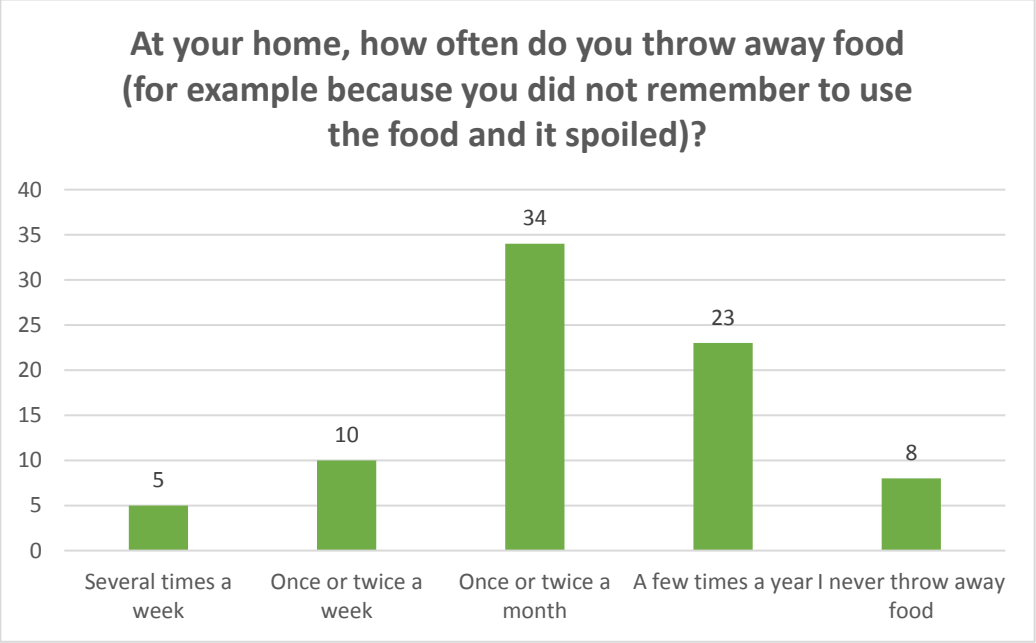

FIGURE 11. Throwing away of food at home

In 14th question, the respondents were asked whether they think that most groceries are still safe to use after the best-before or use-by dates. The available options were “yes”, “no” and “hard to say”. Figure 12 shows that majority of the respondents, 42 of them, thought that the groceries were still safe to use after the date marks. The option “no” was chosen by 21 persons and 17 respondents thought that it was hard to say, whether the groceries were still safe to use or not.

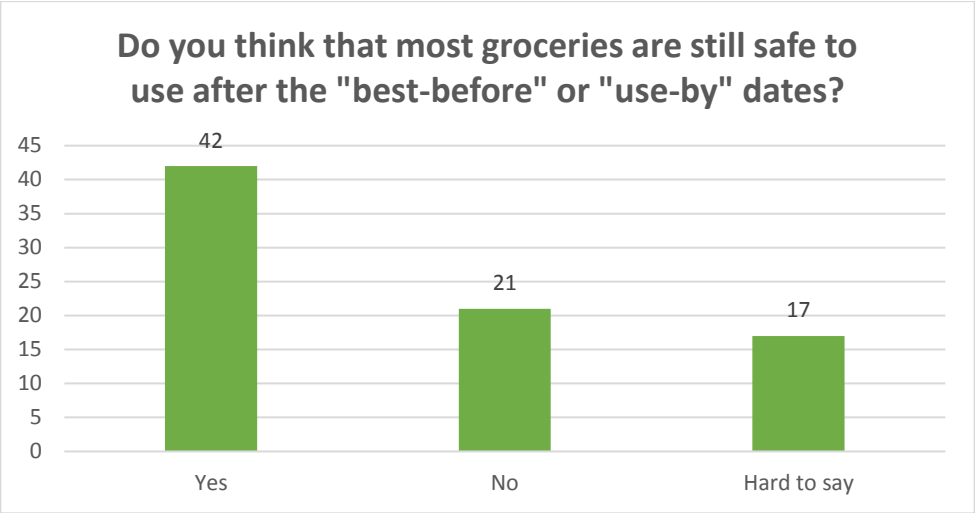

FIGURE 12. Using of groceries after the best-before and use-by dates

The last question was about food waste law. The respondents were told that in France, there is a law which forbids supermarkets to throw away or destroy unsold food and instead of that, they must donate it to charities and food banks. After that, the respondents were asked whether a similar law should also be valid in Finland. The given options were “yes”, “no” and “hard to say”. As the figure 13 shows, a clear majority of the respondents, 60 of them, thought that similar law should be valid in Finland. A minority of the respondents chose the option “hard to say”, while only 7 persons answered “no”.

FIGURE 13. Food waste law to Finland

7 CONCLUSIONS

The main objective of this thesis was to examine food industry and its sustainability and find out what Centria students are thinking about these issues. To clarify students' opinions about this topic, a quantitative research method was used.

The theoretical framework of this thesis composed from three different parts. The first chapter discussed about the extensive problems behind food industry, such as social, ethical and environmental problems. There was also a discussion about the genetic modification of food. The second chapter dealt with the ways to make food production more sustainable, like for example organic farming and minimization of food waste. Consumers' point of view and their ability to effect on the food industry was taken into consideration on the third chapter. The topics in this chapter were, for instance local produced food, fairtrade products and the reduction of animal products.

The research results gave a good overview on students' opinions about food industry sustainability and their habits as consumers. The research results revealed that the thing that mattered the most for students when buying food, was cheap price. It is not surprising that the price is the thing mattering the most, as the students usually have quite a strict budget and not that much extra money to spend. Healthiness was also an important thing for many students. Many of the students bought organic food every week or couple times a month but over a half of the students also thought that organic food is too expensive. A clear majority had a diet which included meat or fish and about a half of the students thought that production animals are treated well in Finland. Nevertheless, still quite many of them had also thought about reducing their meat and fish eating. Genetic modification of food was either a neutral or negative thing for most students. A bit over a half of the students considered that most groceries were still safe to use after the date marks. When students were asked if the similar food waste law as in France should also be valid in Finland, a clear majority of them answered yes.

In this research, the consumers of food were the target group but for further research it would be good to examine the producers and suppliers of food about their sustainability. Interesting companies to investigate could be for example Valio, Snellman, Paulig and Fazer. It would be very interesting to know how these kinds of companies are taking the sustainability issues into account in general. Different restaurants, cafes and grocery stores could also be suitable research targets.

The author thinks that writing this thesis has been very instructive and rewarding process. This topic was chosen, as the author has a personal interest towards it and she thinks that these issues should be discussed more. It was fascinating to take a closer look at the topic and find out what kinds of opinions other students have about it. The process also got the author to think about her own habits as a consumer and recently, she has decided to reduce her meat eating and eat vegetarian food at least a couple days a week.

As earlier mentioned, there are many extensive problems related to food industry and many things should be done differently so that the industry would work sustainably. The author believes that consumers are in a key role what comes to changing things, as by buying something, they show what kind of food they want to consume and eat. The author thinks that consumers should be conscious and ask questions like “who has produced this food and how?” more often, as in that way they can make a difference.

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Survey: Sustainable development in food industry

The aim of this research is to determine attitudes and habits related to food industry and its sustainability. The researcher would like to know what do you, as a Centria student, think about these issues. Your opinion is very important so please answer to this questionnaire by choosing the right option. All the information will be handled with confidentiality. The survey is a part of a Bachelor's thesis.

Nelli Karila

Centria University of Applied Sciences

Degree Programme in Tourism

nelli.karila@cou.fi

Please choose the option which is most suitable for you.

1. Gender
   - Male
   - Female

2. Age
   - 17-21
   - 22-26
   - 27-31
   - 32-36
   - Over 36

3. Nationality
   - Finnish
   - EU citizen
   - Non EU citizen

4. Do you think that it is easy to find out how the food that you buy has been produced?
    - Yes
    - No
    - Hard to say

5. How often do you buy organic food?
    - Every week
    - Couple times a month
    - Once in a month or more rarely
    - Couple times a year
    - I don't buy organic food

6. Do you think that organic food is too expensive?
    - Yes
    - No
    - Hard to say

7. Do you favor local produced food if it is available?
    - Yes, as often as possible
    - Yes, sometimes
    - No

8. When you buy food, what are the things that matter the most? Select maximum of three options.
    - Cheap price
    - Familiarity
    - Delicacy
    - Organic sign
    - Locality
    - Healthiness
    - Ethicalness
    - Other, which? _____

9. Does meat (beef, pork, chicken etc.) or fish belong to your diet?
    - Yes
    - No

If you answered "no", please continue to the question 11. Otherwise, continue to the next question.

10. Have you thought about reducing your meat and fish consumption and eat more vegetarian food instead?
    - Yes
    - No

11. Do you think that production animals are treated well here in Finland?
    - Yes
    - No
    - Hard to say

12. What do you think about genetic modification of food?
    - I consider it as a positive thing
    - I consider it as a neutral thing
    - I consider it as a negative thing
    - Hard to say

13. At your home, how often do you throw away food (for example because you did not remember to use the food and it spoiled)?
    - Several times a week
    - Ones or twice a week
    - Once or twice a month
    - A few times a year
    - I never throw away food

14. Do you think that most groceries are still safe to use after the “best-before” or “use-by” dates?
    - Yes
    - No
    - Hard to say

15. In France, there is a law which forbids supermarkets to throw away or destroy unsold food and instead of that, they have to donate it to charities and food banks. Do you think that similar law should be valid also in Finland?
    - Yes
    - No
    - Hard to say

Thank you for your cooperation!